Pranav Tej Gangavarapu

M. Sc. Robotics and Autonomous Systems

Contact

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(willing to relocate)

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Skills

Programming Languages:

- Python
- C++ (basic)
- Matlab

Libraries:

- numpy
- OpenCV
- SciPy
- shapely
- scikit-image
- matplotlib

Software and Tools:

- ROS
- Coppelia
- Gazebo
- Simulink
- Linux
- Git
- CAD

Personal skills:

- Creative
- Teamwork
- Quick learner
- Problem solver

Biography

As a passionate and dedicated Robotics enthusiast, my expertise lies in the fascinating realm of mobile robotics, mapping, navigation, motion planning, and control. With solid understanding of the core concepts in robotics, I am eager to contribute my knowledge and enthusiasm to the development of innovative robotic systems.

Work experience

Master Thesis

04/2023 - 10/2023

Institute for Robotics and Autonomous Systems
(Dr. Ngoc Thinh Nguyen)
Universität zu Lübeck

- Conducted kinematic and dynamic analysis of a 4-wheel independent steering system, enhancing understanding of complex robotic mechanisms.
- Developed motion planning and control algorithms for real-world implementation, contributing to advancements in autonomous robotics.[4].
- Created a simulation model in Gazebo to rigorously test and validate the developed algorithms, ensuring robust performance in diverse scenarios.
- Developed a ROS software package to oversee robot operations in simulation and real-world scenarios.

Student Research Assistant

10/2022 - 10/2023

Institute for Robotics and Autonomous Systems
Universität zu Lübeck

- Upgraded and maintained mobile robots, including installing new components and troubleshooting issues.
- Assisted students with practical exercises and provided clear explanations of robotics concepts.
- Contributed significantly to the development and upkeep of laboratory robots.
- Independently managed projects, demonstrated organizational skills and self-sufficiency in work.

Intern

04/2022 - 09/2022

Institute for Robotics and Autonomous Systems
Universität zu Lübeck

- Developed a polytope-based mapping and path planning algorithm for advanced robotic navigation [1].
- Developed a polytope-based mapping and path planning algorithm for advanced robotic navigation.
- Supported researchers in preparing conference papers for publication in leading robotics conferences. [2], [3].
- **Project repo:** `https://gitlab.rob.uni-luebeck.de/robPublic/navigation_with_polytopes`

Languages

German A2

English C1

Hindi Fluent

Telugu Native

Interests

- Playing guitar
- Cooking
- Playing volleyball

Awards

2023 Best poster award

· Best poster second prize in *BioMedTec student conference 2023*, Lübeck.

Education

M.Sc. in Robotics and Autonomous Systems — 10/2019 - 11/2023

Universität zu Lübeck, Lübeck, Germany

Artifial Inteligence | Advanced Robotics | Control and Automation

Master thesis: "Motion planning and control of 4-wheel drive mobile robot in agriculture.".

B.Tech. in Mechanical Engineering — 09/2014 - 06/2018

Jawaharlal Nehru Technological University, Hyderabad, India

Robotics | Mechanical Design | Automobile Engineering

Bachelor thesis: "Design and optimization of Differential by varying loads using different materials using CAD and ANSYS".

Academic Projects

Kinematic and Dynamic analysis of robot arms and wheeled mobile robots, programming with raspberry pi. — 04/2020 - 09/2020

- Implementation of forward, inverse kinematics & dynamics for robot arms.
- Kinematic, dynamic modelling, path planning and control of mobile robots.

Motion planning, Mapping, Localization, Control of ground, aerial and underwater vehicles in ROS. — 04/2021 - 09/2021

- Implemented and rigorously tested UAV controllers within the ROS framework.
- Evaluated the efficiency of various algorithms such as A*, RRT*, and potential field-based approaches to optimize navigation paths.

Automated centerline extraction from segmented colon data. — 01/2022 - 03/2022

- Developed an algorithm to find the centerline of a segmented 3D colon.

Publications

[1] Ngoc Thinh Nguyen, **Pranav Tej Gangavarapu**, Arne Sahrhage, Georg Schildbach, and Floris Ernst, "Navigation with polytopes and B-spline path planner," in *Proc. of the 2023 IEEE International Conference on Robotics and Automation (ICRA)*. IEEE, 2023, pp. 5695–5701.

[2] Ngoc Thinh Nguyen, **Pranav Tej Gangavarapu**, Niklas Finn Kompe, Georg Schildbach, and Floris Ernst, "Navigation with polytopes: A toolbox for optimal path planning with polytope maps and B-spline curves," *Sensors*, vol. 23, no. 7, 2023.

[3] Ngoc Thinh Nguyen, **Pranav Tej Gangavarapu**, and Floris Ernst, "B-Spline-to-Bézier Conversion and Applications on Path Planning," *2023 9th International Conference on Control, Decision and Information Technologies (CoDIT)*, Rome, Italy, 2023, pp. 2643-2648.

[4] Ngoc Thinh Nguyen, **Pranav Tej Gangavarapu**, Nicolas Mandel, Ralf Bruder, and Floris Ernst. "Motion Planning for 4WS Vehicle with Autonomous Selection of Steering Modes via an MIQP-MPC Controller," *accepted at 2024 IEEE International Conference on Robotics and Automation (ICRA)* , Japan.